CLAIMS

1. A phase shift circuit, comprising:

a first switching element for switching between a through path and a capacitor of a capacitance C_1;

a second switching element for switching between a through path and a capacitor of a capacitance C_2 with respect to a ground; and

first and second inductors each having an inductance L,

wherein one ends of the first and second switching elements are connected to each other through the first inductor, the other ends of the first and second switching elements are connected to each other through the second inductor, the one end of the first switching element is connected to a high frequency signal input terminal, the other end of the first switching element is connected to a high frequency signal output terminal, and following expressions are satisfied assuming that a characteristic impedance of the high frequency signal input terminal and the high frequency output terminal is Z_0:

$$C_2 = 4C_1 \qquad (1)$$

$$Z_0 = (L/2C_1)^{1/2} \qquad (2).$$

2. The phase shift circuit according to claim 1, characterized in that:

the first switching element is constituted by a switching element that is indicative of a through state at a time of on and a capacitivity at a time of off;

the second switching element is constituted by a parallel circuit in which an inductor is connected in parallel with a switching element indicative of a through state at the time of on and a capacitivity at the time of off, and a series circuit composed of

the parallel circuit and the capacitance of the capacitor; and

one end of the series circuit is connected to the ground, and the other end of the series circuit is connected to the other ends of the first and second inductors.

3. The phase shift circuit according to claim 2, characterized in that

the capacitance of the capacitor is constituted by a switching element indicative of the through state at the time of on and the capacitivity at the time of off.

4. The phase shift circuit according to claim 2, characterized in that

the parallel circuit is replaced with a switching element indicative of the through state at the time of on and the capacitivity at the time of off.

5. The phase shift circuit according to claim 2, characterized in that

the switching element indicative of the through state at the time of on and the capacitivity at the time of off is replaced with a parallel circuit that includes a switching element indicative of the through state at the time of on and the capacitivity at the time of off, and a capacitor.

6. A high frequency switch, comprising:

a first conductor and a control electrode that are formed on a bottom surface of a cavity embedded in only one surface of a substrate;

a dielectric support film that is supported by end portions of the cavity and exists in a hollow through an air layer;

a pair of high frequency signal transmission lines formed to be apart from

each other at an interval on the support film surface; and

a second conductor that is disposed on a rear surface of the support film and forms a parallel plane capacitor between the pair of high frequency signal transmission paths,

wherein each of the pair of high frequency signal transmission lines has a conductive projection penetrating a part of the support film, and when a voltage is applied to the control electrode, the support film is displaced toward the bottom surface of the cavity and each of the conductive projections is brought in contact with the first conductor to provide a through state, such that a through/series capacitance switching element that is mechanically driven is structured.

7. A high frequency switch, comprising:

a ground conductor and a control electrode which are formed on a bottom surface of a cavity embedded in only one surface of a substrate;

a dielectric support film that is supported by end portions of the cavity and exists in a hollow through an air layer; and

a high frequency signal transmission line that is formed on the support film surface,

wherein when a voltage is applied to the control electrode, the support film is displaced toward the bottom surface of the cavity and the support film is brought in contact with the ground conductor to provide a state indicative of the capacitance with respect to the ground, such that a through/shunt capacitance switching element that is mechanically driven is structured.

8. A high frequency switch, comprising:

a pair of high frequency signal transmission lines formed to be apart from each other at an interval on a bottom surface of a cavity that is embedded in only one surface of a substrate and have a conductive projection, respectively;

a dielectric film that is formed on the pair of high frequency signal transmission lines to extend across the pair of high frequency signal transmission lines;

a first conductor formed on the dielectric film;

a dielectric support film supported by end portions of the cavity and exists in a hollow through an air layer;

a second conductor formed on a rear surface of the support film; and

a control electrode formed on the support film surface,

wherein when a voltage is applied to the control electrode, the support film is displaced toward the bottom surface of the cavity and the second conductor is brought in contact with the respective conductive projections to provide a through state, such that a through/series capacitance switching element that is mechanically driven is structured.

9. A high frequency switch, comprising:

a high frequency signal transmission line that is formed on a bottom surface of a cavity embedded in only one surface of a substrate;

a dielectric support film that is supported by end portions of the cavity and exists in a hollow through an air layer; and

a ground conductor and a control electrode that are formed on the support

film surface,

wherein when a voltage is applied to the control electrode, the support film is displaced toward the bottom surface of the cavity, and the support film is brought in contact with the high frequency signal transmission line to provide a state indicative of a capacitance with respect to a ground, such that a through/shunt capacitance switching element that is mechanically driven is structured.

10. The phase shift circuit according to claim 1, characterized in that:

the first switching element comprises the high frequency switch according to claim 6 or 8; and

the second switching element comprises the high frequency switch according to claim 7 or 9.

11. A multi-bit phase shifter characterized by comprising a combination of the phase shift circuits according to any one of claims 1 to 5.

12. A multi-bit phase shifter characterized by comprising a combination of the phase shift circuits according to claim 10.